

TFT-Display Datenblatt

Modell OT024AQUDDN-00

Kurzdaten

Hersteller	ONation
Diagonale	2,4" / 6,1 cm
Format	3:4
Auflösung	240 x 320
Backlight	LED / 150 cd/m ²
Interface	RGB
Touchscreen	nein
Temperatur	-20... +70°C (Betrieb)



Vertrieb durch:



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ONATION CORPORATION

CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: OT024AQUDDN-00
(Complied with RoHS)

CUSTOMER: _____

Version:P0.1

C O N T E N T S

ISSUE:FEB.11.2011

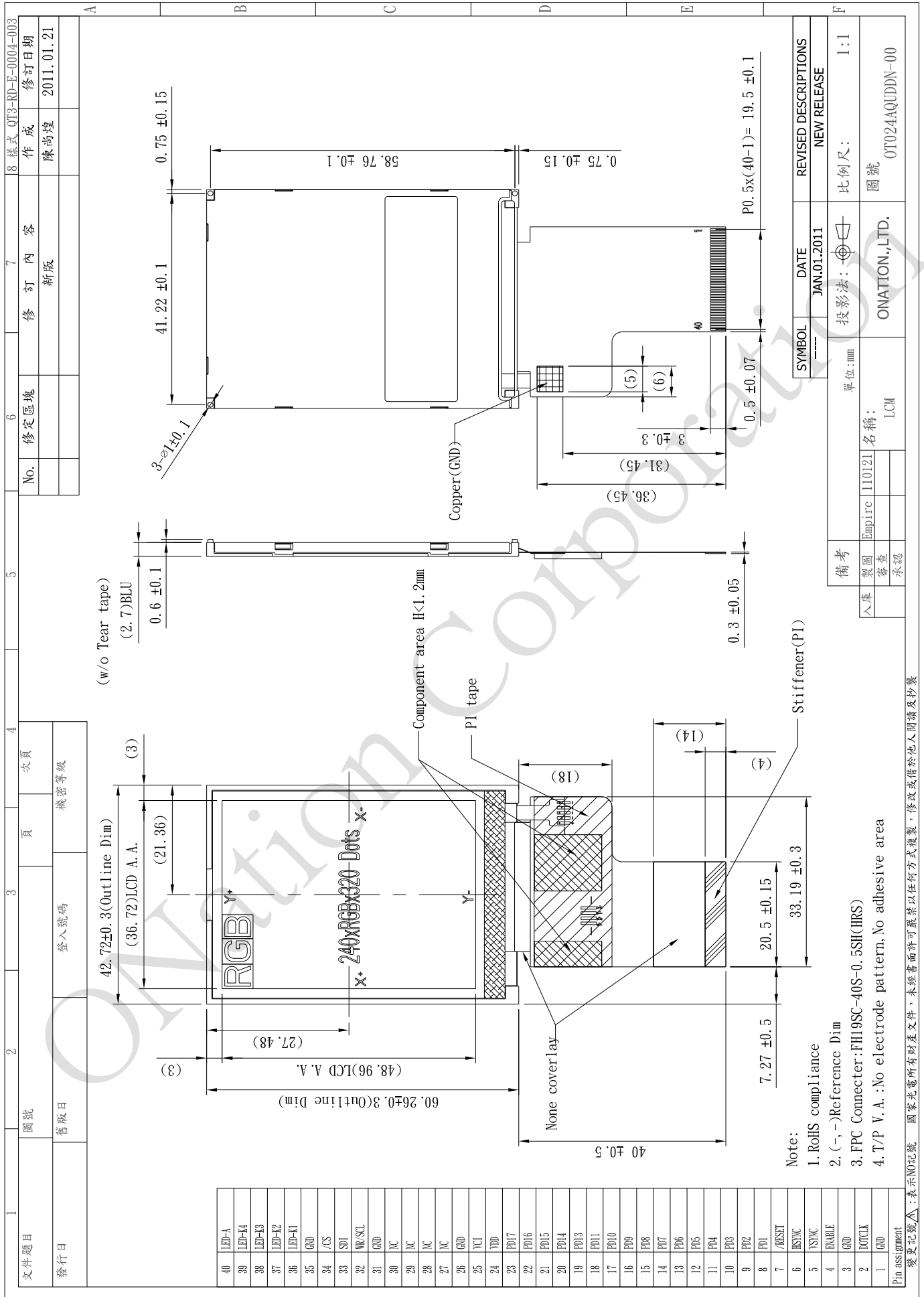
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CUSTOMER	ONATION CORPORATION		
APPROVAL	APPROVAL	CHECKER	PREPARE
	<i>ch lee</i>	<i>ch lee</i>	<i>lan</i>

3.MECHANICAL SPECIFICATIONS

No.	Item	Specification
(1)	Number Of Dots (Dots)	240 X RGB X 320
(2)	Module Size(mm)	42.72(H) X 60.26(V) X 2.7(D)
(3)	Active Area(mm)	36.72(H) X 48.96(V)
(4)	Pixel Pitch(mm)	0.153(H) X 0.153(V)
(5)	LCD Model	Normally White TN
(6)	LED Backlight Color	White
(7)	Viewing Direction	12 o'clock
(8)	Color Configuration	R.G.B Vertical Stripe
(9)	Driving Method	COG TYPE
(10)	Driver IC	HX8347D
(11)	Module Weight(g)	(17.5)

4. OUTLINE DIMENSIONS



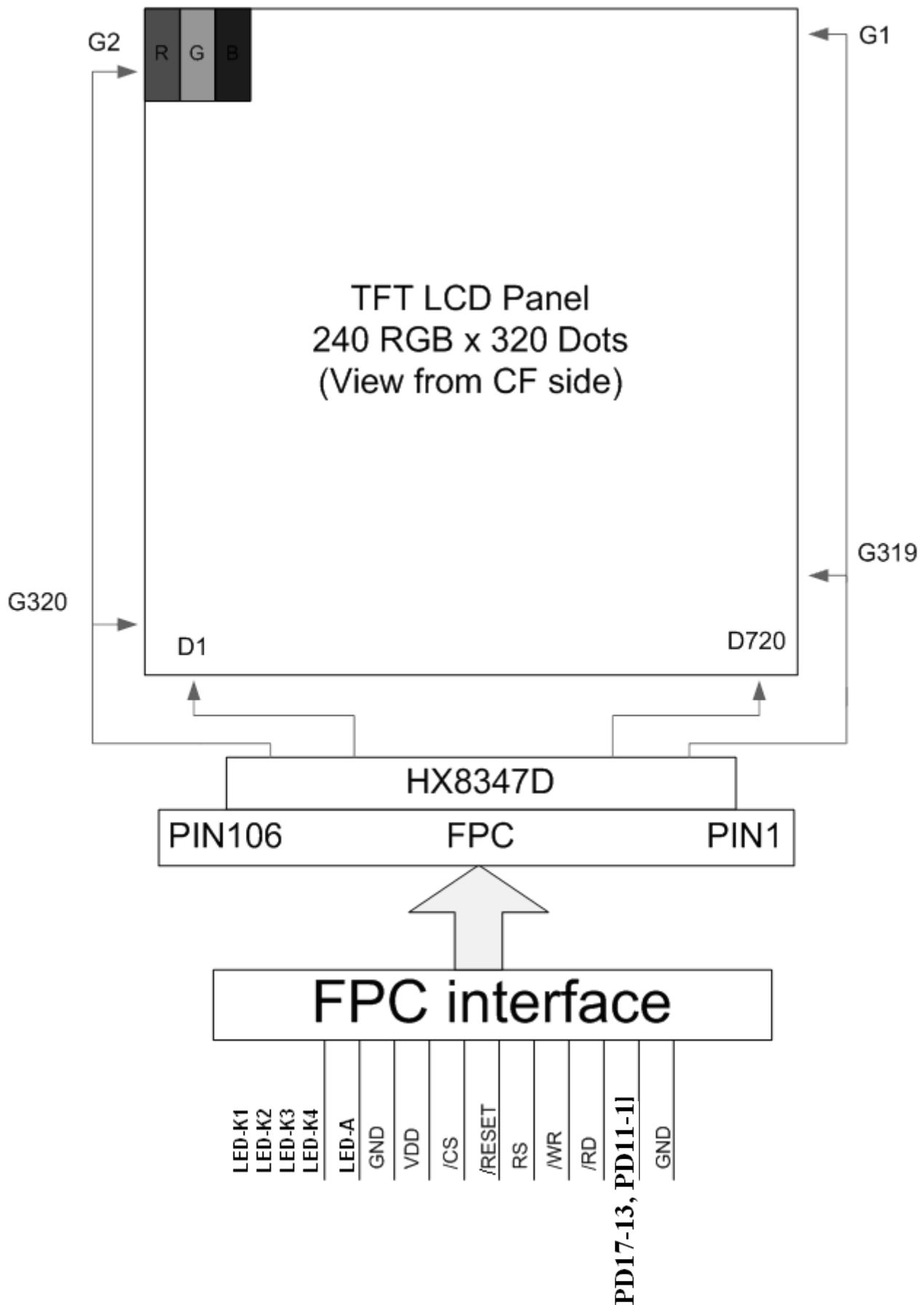
變更記號: 表示NO記號 國家光電所有財產文件, 未經書面許可嚴禁以任何方式複製, 修改或借於他人閱讀及抄襲

5. INTERFACE PIN CONNECTION

LCM PANEL DRIVING SECTION(Connector: HIROSE FH19SC-40S-0.5SH or Equivalent)

No.	Symbol	I/O	Function
1	GND	P	Ground
2	DOTCLK	I	Clock input
3	GND	P	Ground
4	ENABLE	I	Data enable signal
5	VSYNC	I	Vertical synchronous signal
6	HSYNC	I	Horizontal synchronous signal
7	/RESET	I	Hardware reset
8	PD1	I/O	Blue signal data bus(LSB)
9	PD2	I/O	Blue signal data bus
10	PD3	I/O	Blue signal data bus
11	PD4	I/O	Blue signal data bus
12	PD5	I/O	Blue signal data bus(MSB)
13	PD6	I/O	Green signal data bus(LSB)
14	PD7	I/O	Green signal data bus
15	PD8	I/O	Green signal data bus
16	PD9	I/O	Green signal data bus
17	PD10	I/O	Green signal data bus
18	PD11	I/O	Green signal data bus(MSB)
19	PD13	I/O	Red signal data bus(LSB)
20	PD14	I/O	Red signal data bus
21	PD15	I/O	Red signal data bus
22	PD16	I/O	Red signal data bus
23	PD17	I/O	Red signal data bus(MSB)
24	VDD	P	Digital power supply voltage
25	VCI	P	Analog power supply voltage
26	GND	P	Ground
27	NC	-	No connection
28	NC	-	No connection
29	NC	-	No connection
30	NC	-	No connection
31	GND	P	Ground
32	WR/SCL	I	Clock pin for serial pin
33	SDI	I	Data input pin for serial mode
34	/CS	I	Chip select
35	GND	P	Ground
36	LED-K1	P	Cathode for LED
37	LED-K2	P	Cathode for LED
38	LED-K3	P	Cathode for LED
39	LED-K4	P	Cathode for LED
40	LED-A	P	Anode for LED

6. BLOCK DIAGRAM



7. ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	Values		UNIT	Remark
		MIN.	MAX.		
Power Supply Voltages	VDD	-0.3	+4.6	V	
	VCI	-0.3	+4.6	V	

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		Remark
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-20	70	-30	80	Note 1,2,3
Humidity		90	-	90	Note 4

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Operation $T_a=70^{\circ}\text{C}$ & $-20^{\circ}\text{C} \leq 240\text{Hrs}$.

Note 4 : Operation $T_a=60^{\circ}\text{C}$ & $H=90\% \leq 240\text{Hrs}$.

8. ELECTRICAL CHARACTERISTICS

8.1 LCM ELECTRICAL CHARACTERISTICS

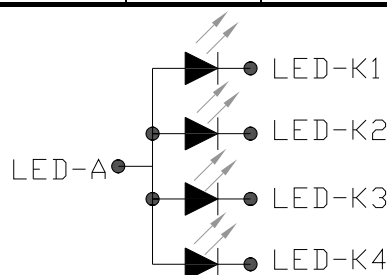
($T_a=25^{\circ}\text{C}$)

Item	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power voltage	VDD	1.65	2.8	3.3	V
	VCI	2.5	2.8	3.3	V
Current Consumption**	I_{DD}	-	(4.66)	-	mA
Input high voltage	V_{IH}	$0.8 \cdot V_{DD}$	-	VDD	V
Input low voltage	V_{IL}	GND	-	$0.2 \cdot V_{DD}$	V
Output high voltage	V_{OH}	$0.8 \cdot V_{DD}$	-	VDD	V
Output low voltage	V_{OL}	0	-	$0.2 \cdot V_{DD}$	V

**Test pattern:Black

8.2 BACKLIGHT UNITS

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
LED Voltage	V_L	-	(3.2)	-	V	
LED Current	I_f	-	60	-	mA	



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9.OPTICAL CHARACTERISTICS

Ta=25°C

Item	Symbol	Conditions	Specifications				REMARK
			Min.	Typ.	Max.	Unit	
Contrast Ratio	CR	At optimized Viewing angle	-	250	-	-	Note (1)
Response Time (Tr+Tf)		T=0	-	30	-	ms	Note (2)
Brightness		Center	-	(150)	-	cd/m2	
Uniformity			-	80	-	%	Note (5)
Color Chromaticity	Red	XR	(0.51)	(0.64)	(0.71)	-	Note (4)
		YR	(0.28)	(0.33)	(0.38)		
	Green	XG	(0.26)	(0.31)	(0.36)	-	
		YG	(0.57)	(0.62)	(0.67)		
	Blue	XB	(0.09)	(0.14)	(0.19)	-	
		YB	(0.06)	(0.06)	(0.11)		
	White	XW	(0.23)	(0.28)	(0.33)	-	
		YW	(0.25)	(0.30)	(0.35)		
Viewing Angle		θ Y+	50		Deg.	Note (3)	
		θ Y-	30				
		θ X-	60				
		θ X+	60				

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

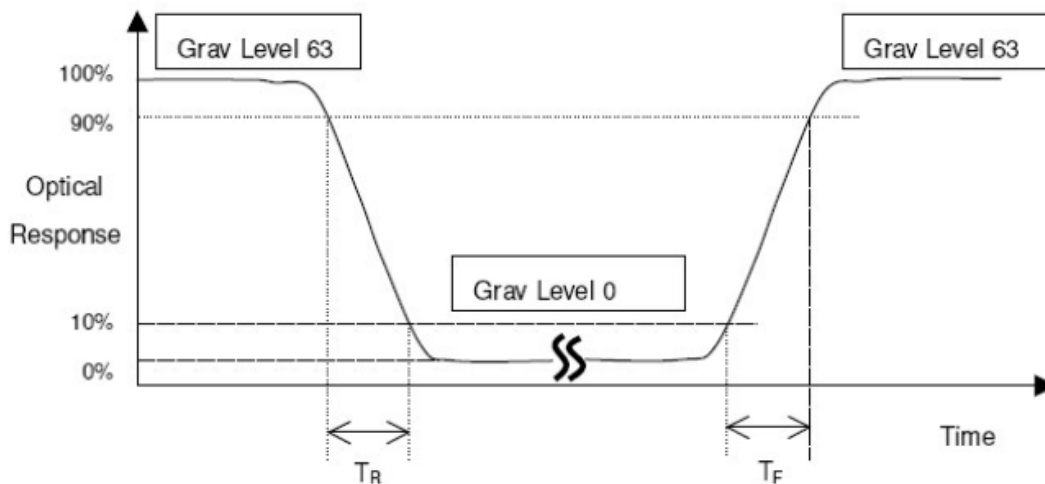
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

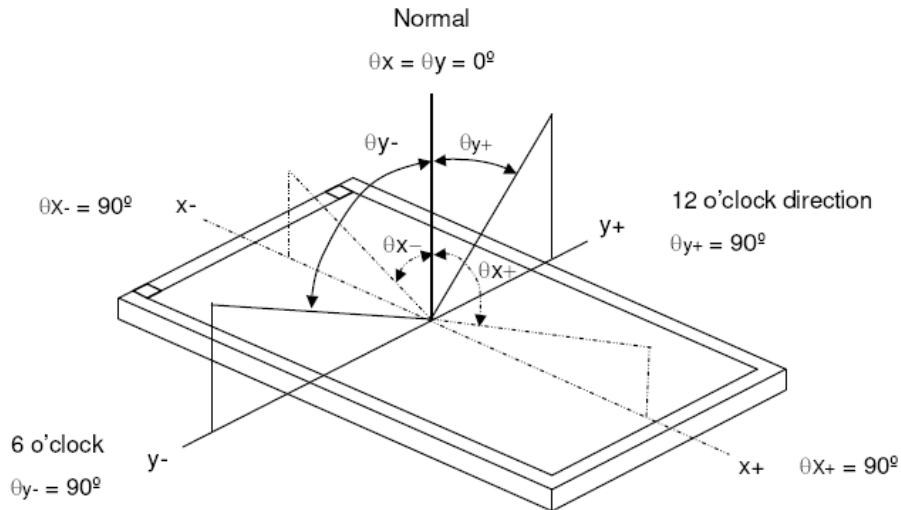
$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (TR, TF):

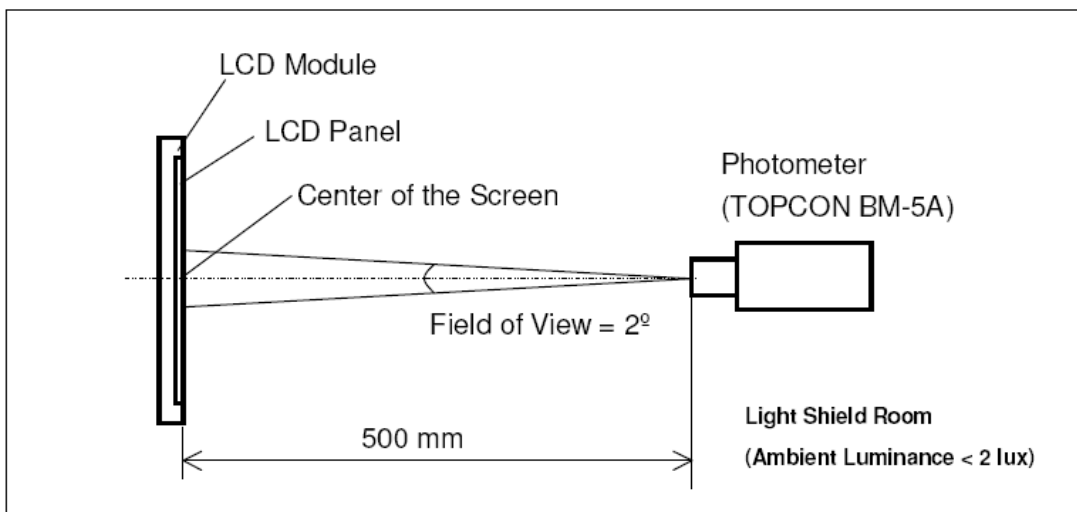


*Note(3) Definition of Viewing Angle

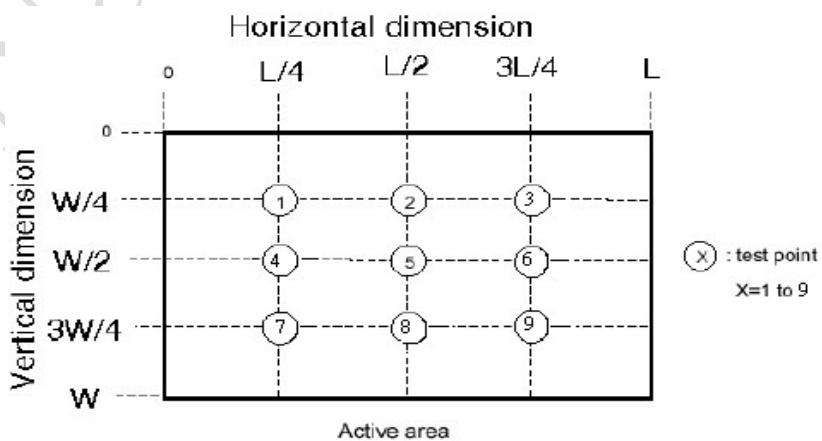


*Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



*Note(5)



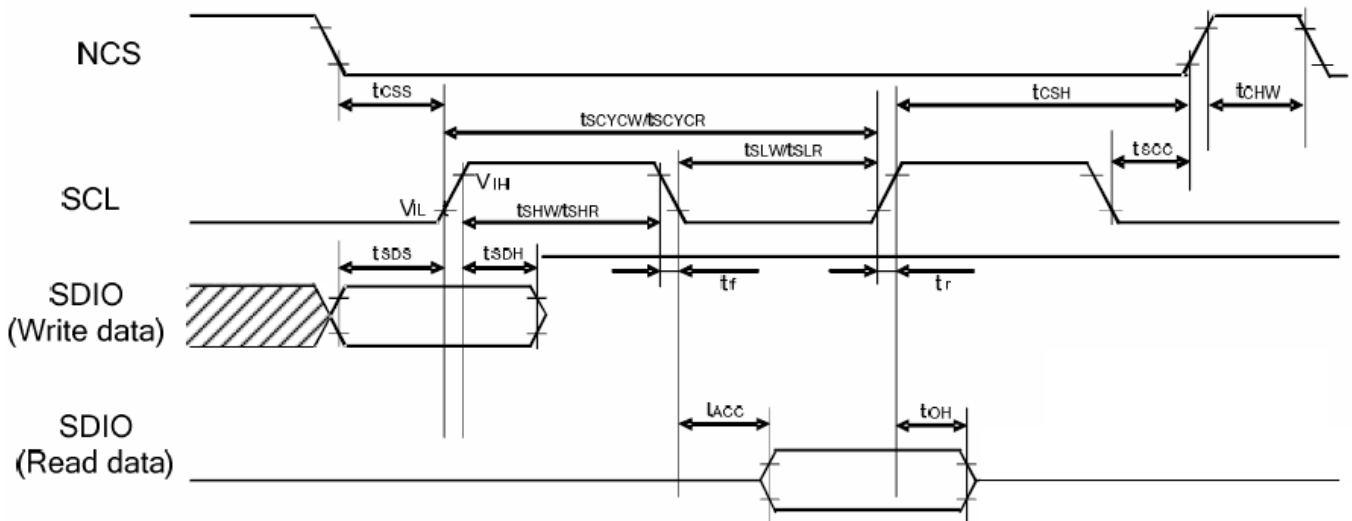
$$\left[1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right] \times 100\% > 80\%$$

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10. AC CHARACTERISTICS

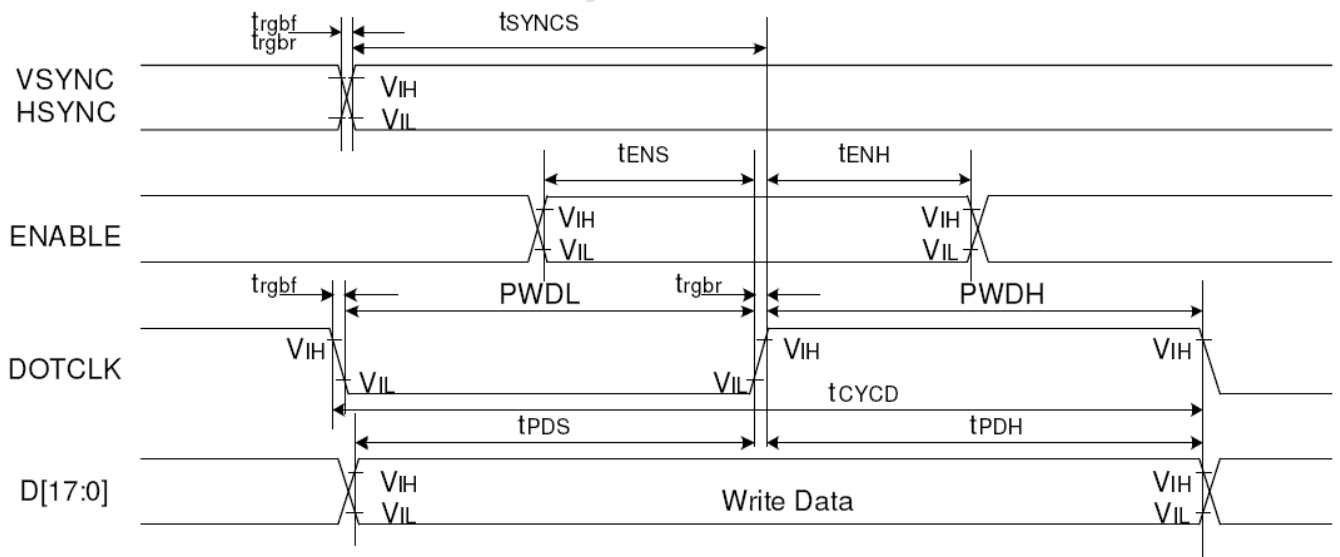
10.1 SERIAL DATA TRANSFER INTERFACE TIMING CHARACTERISTICS

Signal	Symbol	Parameter	min	max	Unit	Remarks
SCL	tscycw	Serial clock cycle (write)	20	-	ns	
	tshw	SCL "H" pulse width (write)	8	-	ns	
	tslw	SCL "L" pulse width (write)	8	-	ns	
	tscycr	Serial clock cycle (read)	150	-	ns	
	tshr	SCL "H" pulse width (read)	60	-	ns	
	tslr	SCL "L" pulse width (read)	60	-	ns	
SDIO	tsds	Data setup time (write)	10	-	ns	
	tsdh	Data hold time (write)	10	-	ns	
SDI/SDO	tacc	Access time (read)	10	50	ns	
	toh	Output disable time (read)	15	50	ns	
NCS	tchwh	CSX "H" pulse width	40	-	ns	
	tcss	CSX-SCL time (write)	15	-	ns	
	tcsh		15	-	ns	

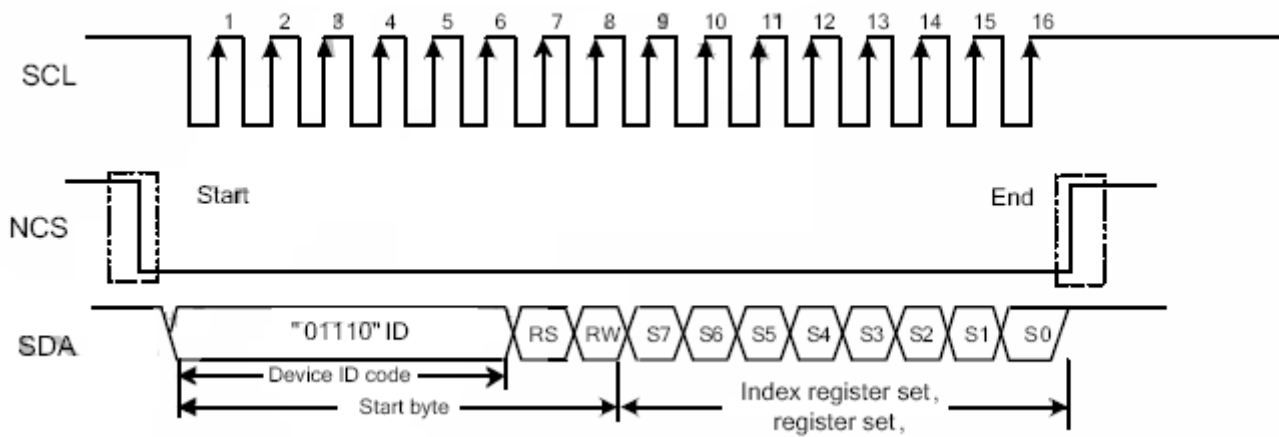


10.2 PARALLEL 18/16-bit RGB INTERFACE TIMING CHARACTERISTICS

Signal	Symbol	Condition	min	max	Unit	Remarks
Pixel low pulse width	T_{CLKLT}	-	15	-	ns	
Pixel high pulse width	T_{CLKHT}	-	15	-	ns	
Vertical Sync. set-up time	T_{VSST}	-	15	-	ns	
Vertical Sync. hold time	T_{VSSH}	-	15	-	ns	
Horizontal Sync. set-up time	T_{HSST}	-	15	-	ns	
Horizontal Sync. hold time	T_{HSSH}	-	15	-	ns	
Data enable set-up time	T_{DEST}	-	15	-	ns	
Data enable hold time	T_{DEHT}	-	15	-	ns	
Data set-up time	T_{DST}	-	15	-	ns	
Data hold time	T_{DHT}	-	15	-	ns	
Phase difference of sync signal falling edge	Thv	-	0	240	dotclk	



10.3 SERIAL INTERFACE(3-wire)



RS	R/W	Function
0	0	Set index register
1	0	Writes instruction or GRAM data
1	1	Reads command (not support GRAM read)

10.4 RGB INTERFACE

17H	D17	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	Bus width
50h	R4	R3	R2	R1	R0	x	G5	G4	G3	G2	G1	G0	B4	B3	B2	B1	B0	x	16-bit data

11. RELIABILITY TEST

Environmental Test				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80°C	240HRS	
2	Low Temperature Storage	-30±3°C	240HRS	
3	High Temperature Operation	70°C	240HRS	
4	Low Temperature Operation	-20°C	240HRS	
5	Temperature Cycle	-30°C ←→ 80°C (30min) (30min)	50CYCLE	
6	High Temperature Humidity Operation	60°C 90%RH	240HRS	

NOTE (1): a. THE MODULE SHOULD WORK PROPERLY.

b. BEFORE AND AFTER FUNCTION TEST, THE DIFFERENCE OF CONSUMPTIVE CURRENT SHOULD BE WITHIN 10%

NOTE (2) : a. THE MODULE SHOULD WORK PROPERLY.

b. THE MODLUE WON'T BE DEFORMATIVE, COLOR CHANGEABLE OR BROKEN.

c. THE MODULES CAN'T BE APART.